AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method for fabricating a nanoporous structure, said method comprising the steps of:

depositing an array of porogens on a substrate;

crystallizing the porogens such that the porogens are densely packed;

depositing a material from a vapor phase to fill open spaces between the porogens to form a structure with embedded porogens; and

inducing thermal decomposition of the porogens.

2. (Currently amended) A method for fabricating a nanoporous structure, said method comprising the steps of:

depositing an array of porogens on a substrate;

crystallizing the porogens such that the porogens are densely packed;

depositing a material from a vapor phase to fill open spaces between the porogens to form a structure with embedded porogens; and

inducing decomposition of the porogens, ~~The method of claim 1,~~ wherein the steps of depositing an array of porogens, crystallizing, and depositing a material are repeated.

3. (Currently amended) The method of claim [[1]] 4, wherein the steps of depositing an array of porogens, crystallizing, and depositing a material are completed simultaneously.

4. (Currently amended) A method for fabricating a nanoporous structure, said method comprising the steps of:

depositing an array of porogens on a substrate;

crystallizing the porogens such that the porogens are densely packed;

depositing a material from a vapor phase to fill open spaces between the porogens to form a structure with embedded porogens; and

inducing decomposition of the porogens, ~~The method of claim 1,~~

wherein the steps of depositing an array of porogens and depositing a material are completed simultaneously.

5. (Original) The method of claim 1, wherein the step of depositing an array of porogens is performed by spray deposition.

6. (Original) The method of claim 5, wherein the step of depositing an array of porogens is performed using an ultrasonic atomizer.

7. (Original) The method of claim 1, wherein the step of depositing an array of porogens is performed using a syringe.

8. (Original) The method of claim 1, wherein the step of depositing an array of porogens further comprises applying an aqueous suspension of porogens over a surface of the substrate.

9. (Original) The method of claim 8, wherein the method further comprises utilizing spin coating to disperse the aqueous suspension over the substrate.

10. (Original) The method of claim 1, wherein the step of crystallizing the porogens further comprises thermal gradient heating of the substrate.

11. (Currently amended) A method for fabricating a nanoporous structure, said method comprising the steps of:

depositing an array of porogens on a substrate;

crystallizing the porogens such that the porogens are densely packed;

depositing a material from a vapor phase to fill open spaces between the porogens to form a structure with embedded porogens; and

inducing decomposition of the porogens, ~~The method of claim 1,~~ wherein the method further comprises heating the substrate to approximately 95°C prior to the step of depositing the array of porogens.

12. (Currently amended) A method for fabricating a nanoporous structure, said method comprising the steps of:

depositing an array of porogens on a substrate;

crystallizing the porogens such that the porogens are densely packed;

depositing a material from a vapor phase to fill open spaces between the porogens to form a structure with embedded porogens; and

inducing decomposition of the porogens, ~~The method of claim 1,~~

wherein the substrate is selected from the group consisting of silicons, silicon dioxides, silicon-germaniums, glasses, silicon nitrides, ceramics, aluminums, coppers, and gallium arsenides.

13. (Original) The method of claim 1, wherein the step of depositing an array of porogens comprises depositing an ordered array of porogens.

14. (Original) The method of claim 1, wherein the step of depositing an array of porogens comprises depositing a random array of porogens.

15. (Original) The method of claim 1, wherein the step of depositing an array of porogens comprises depositing porogens that are uniform in size.

16. (Original) The method of claim 1, wherein the step of depositing an array of porogens comprises depositing porogens that vary in size.

17. (Original) The method of claim 1, wherein the step of depositing an array of porogens comprises depositing porogens that have a mean diameter less than 100 nm.

18. (Original) The method of claim 1, wherein the step of depositing an array of porogens comprises depositing porogens that are selected from the group consisting of spherical, circular, planar, linear, cone-shaped, triangular, rectangular, pentagonal, hexagonal, octagonal, and irregular shaped.

19. (Original) The method of claim 1, wherein the step of depositing a material further comprises utilizing chemical vapor deposition (CVD).

20. (Original) The method of claim 1, wherein the step of depositing a material further comprises utilizing pulsed plasma chemical vapor deposition (CVD).

21. (Original) The method of claim 1, wherein the steps of depositing an array of porogens and depositing a material from a vapor phase are performed at specified flow rates, such that porosity of the nanoporous structure can be varied.

22. (Currently amended) The method of claim 1, wherein the step of depositing a material further comprises filling the open spaces with a composition that is a liquid at room temperature and atmospheric pressure. ~~an aqueous solution~~.

23. (Original) The method of claim 1, wherein the step of depositing a material further comprises filling the open spaces with a precursor reagent.

24. (Original) The method of claim 23, wherein the precursor reagent is selected from the group consisting of halides, hydrides, metal organic compounds, metal alkyls, metal dialylamides, metal diketonates, metal carbonyls, and complexes or ligands thereof.

25. (Canceled)

26. (Currently amended) The method of claim 1, wherein the step of depositing a material further comprises generating ~~a neutral~~ an uncharged species.

27. (Currently amended) A method for fabricating a nanoporous structure, said method comprising the steps of:

depositing an array of porogens on a substrate;

crystallizing the porogens such that the porogens are densely packed;

depositing a material from a vapor phase to fill open spaces between the porogens to form a structure with embedded porogens; and

inducing decomposition of the porogens, ~~The method of claim 1,~~

wherein the step of depositing a material further comprises using low energy plasma energy excitation.

28. (Currently amended) A method for fabricating a nanoporous structure, said method comprising the steps of:

depositing an array of porogens on a substrate;

crystallizing the porogens such that the porogens are densely packed;

depositing a material from a vapor phase to fill open spaces between the porogens to form a structure with embedded porogens; and

inducing decomposition of the porogens, ~~The method of claim 1~~

wherein the step of depositing a material further comprises filling the open spaces with the ~~a silicate~~ material, the material including at least one of a silicate, a metal, and a ceramic.

29. (Currently amended) The method of claim [[1]] 28, wherein the silicate material is selected from the group consisting of silane, acyclic and cyclic siloxanes, acyclic and cyclic silanes, cyclic organosiloxanes, alkyl, alkenyl, or alkoxy substituted silanes, alkyl and alkoxy silanes, alkylated (methylated) derivatives of silane, methylsilane, dimethylsilane, trimethylsilane and tetramethylsilane, $Si_2(CH_3)_nH_{6-n}$ (n=1-6), C_6F_n (n=6-12), C_nF_{2n+2} (n>1), CH_nF_{4-n} (n=1-4), Si_xF_{2x+2} (x=1-4), SiH_nF_{4-n} (n=1-4), Si_nH_{2n+2} (n=1-3), $Si(OC_nH_{2n+1})_4$ (n=1-2), SiH_2Cl_2, TEOS, and $Si(OC_2H_5)_4$, and derivatives thereof.

30. (Canceled)

31. (Canceled)

32. (Currently amended) A method for fabricating a nanoporous structure, said method comprising the steps of:

depositing an array of porogens on a substrate;

crystallizing the porogens such that the porogens are densely packed;

depositing a material from a vapor phase to fill open spaces between the porogens

to form a structure with embedded porogens; and

inducing decomposition of the porogens, ~~The method of claim 1,~~

wherein the method further ~~comprising~~ comprises selecting porogens that are formed from materials selected from the group consisting of polystyrene, silica, styrene, halogenated styrene, hydroxy-substituted styrene, lower alkyl-substituted styrene, acrylic acid, acrylamide, methacrylic acid, methyl acrylate, ethyl acrylate, butyl acrylate, polyacrylate, ethylene oxide, propylene oxide, poly(methyl methacrylate) (PMMA), poly(alpha-methyl styrene), aliphatic polycarbonates, poly(propylene carbonate) and poly(ethylene carbonate), polyesters, polysulfones, polylactides, polylactones, and combinations thereof.

33. (Currently amended) A method for fabricating a nanoporous structure, said method comprising the steps of:

depositing an array of porogens on a substrate;

crystallizing the porogens such that the porogens are densely packed;

depositing a material from a vapor phase to fill open spaces between the porogens to form a structure with embedded porogens; and

inducing decomposition of the porogens, ~~The method of claim 1,~~

wherein the step of inducing decomposition of the porogens further comprises at least one of pyrolysis, irradiation, and curing the material.

34. (Canceled)

35. (Canceled).

36. (Original) The method of claim 1, wherein the method further comprises establishing a rate of decomposition of the porogens.

37. (Original) The method of claim 36, wherein the step of establishing the rate of decomposition further comprises varying temperature and time of the decomposition step.

38. (Original) The method of claim 1, wherein the method further comprises selecting a porogen with a decomposition temperature above that needed to cure the material.

39. (Currently amended) A method for fabricating a nanoporous structure, said method comprising the steps of:

depositing an array of porogens on a substrate;

crystallizing the porogens such that the porogens are densely packed;

depositing a material from a vapor phase to fill open spaces between the porogens to form a structure with embedded porogens; and

inducing decomposition of the porogens, ~~The method of claim 1,~~ wherein the method further comprises producing an anti-reflective coating on the substrate.

40. (Original) The method of claim 1, wherein the nanoporous structure has a dielectric constant less than 2.7.

41. (Original) The method of claim 1, wherein the nanoporous structure has a dielectric constant less than 2.0.

42. (Original) The method of claim 1, wherein the material is selected from the group consisting of metals, ceramics, OSGs, aluminum oxides, silicon dioxides, cerium oxides, calcium hydroxyapatites, silicons, silicon carbides, and gallium arsenides.

43. (Original) The method of claim 1, wherein the nanoporous structure has a porosity between 1% to 99%.

44. (Original) The method of claim 1, wherein the nanoporous structure has a porosity greater than 50%.

45. (Original) The method of claim 1, wherein the nanoporous structure has a porosity greater than 70% porosity.

46. (Currently amended) A method for fabricating a nanoporous structure, said method comprising the steps of:

depositing an array of porogens on a substrate;

crystallizing the porogens such that the porogens are densely packed;

depositing a material from a vapor phase to fill open spaces between the porogens to form a structure with embedded porogens; and

inducing decomposition of the porogens, ~~The method of claim 1,~~

wherein the step of inducing decomposition of the porogens is performed under ambient conditions at elevated temperatures between 280 °C and 500 °C.

47–62. (Canceled)

63. (New) The method of claim 1, wherein the material has a higher melting temperature than the porogen.

64. (New) The method of claim 1, wherein the nanoporous structure has a dielectric constant less than bulk silicon dioxide.